

Exhibit A2

EXHIBIT A2 - U.S. PATENT 8,063,369
Infringement Claim Chart

U.S. Patent 8,063,369		Teledyne Infringing Activity ¹
Row	Claim 1	Teledyne's Thermal Imaging Devices That Incorporate Bolometer Elements
1A	Bolometer element comprising	<p>The Accused Instrumentalities include a bolometer element.</p> <p>For example, the Accused Instrumentalities include Teledyne's thermal imaging devices that incorporate bolometer elements, including uncooled vanadium oxide (VOx) microbolometer thermal imaging detectors. These detectors are key components of Teledyne's infrared camera cores and lenses, such as the Boson and Boson+ families of longwave infrared (LWIR) thermal camera modules.</p> <p>Teledyne advertises these products as incorporating microbolometer thermal imaging technology. An exemplary model is the Boson family of LWIR thermal camera modules, which includes nearly 30 configurations with various lens options. The Boson+ family offers additional configurations with further enhancements in sensitivity and thermal performance. The bolometer-based detectors used in these products serve as the primary sensing elements for detecting incident radiation and converting it into readable thermal images.</p> <p><u>Exemplary Sources</u> <i>E.g.</i>, Teledyne FLIR - Thermal Camera Cores; Teledyne FLIR - Boson LWIR Camera Module; Teledyne FLIR - Boson+ LWIR Camera Module; Teledyne Imaging - Infrared Microbolometer VOx; Teledyne DALSA - Infrared Detectors and Microbolometers; Teledyne Imaging - Infrared Sensor Overview; FLIR Boson Microbolometer Analysis (Yole Group Report).</p>
1B	a first bolometer having a first heating resistance for sensing radiation power directed at the element, and	<p>The Accused Instrumentalities include a first bolometer having a first heating resistance for sensing radiation power directed at the element.</p> <p>For example, Teledyne's microbolometer sensing elements, which are integral to the Boson and Boson+ thermal imaging modules, function as bolometers designed to detect incident infrared radiation and convert it into an electrical signal.</p>

¹ These allegations are exemplary and VTT reserves the right to supplement them as the case progresses.

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	<div data-bbox="669 318 1533 589" style="border: 1px solid black; padding: 10px; margin-bottom: 10px;"> <p style="text-align: center;">How are FLIR's microbolometer arrays packaged? Are they under vacuum? Why?</p> <p style="text-align: center; font-size: small;">The microbolometer sensing elements are <u>thermistors</u> that are suspended, as bridge structures, above a readout integrated circuit, or ROIC. The sensing elements need to be able to change temperature individually in response to small amounts of heat energy. To enable this response to small changes in radiant energy, the sensing elements must be thermally isolated from the ROIC. To achieve the thermal isolation, the sensor is housed in a high-quality vacuum package assembly, or VPA, to eliminate the air gap that would otherwise exist between the thermistors and the ROIC. An air gap would enable a conduction path that effectively dampens the sensor responsivity. The VPA also protects the otherwise fragile array of thermistors.</p> </div> <p>Furthermore, Teledyne itself has acknowledged that the Boson family of products incorporates bolometer-based sensor elements by listing their U.S. Patent No. 11,012,647, titled “Low Cost and High Performance Bolometer Circuitry and Methods,” on their patent marking page as covering these products. The ’647 patent explicitly discloses bolometer structures in which an active bolometer’s resistance changes in response to incident infrared radiation. Specifically, Figure 2A of the ’647 patent depicts bolometer element 202, which corresponds to a first bolometer having a first heating resistance for sensing radiation power. The associated text (col. 14, lines 18-45) further confirms that the bolometer resistance varies with exposure to infrared radiation.</p>

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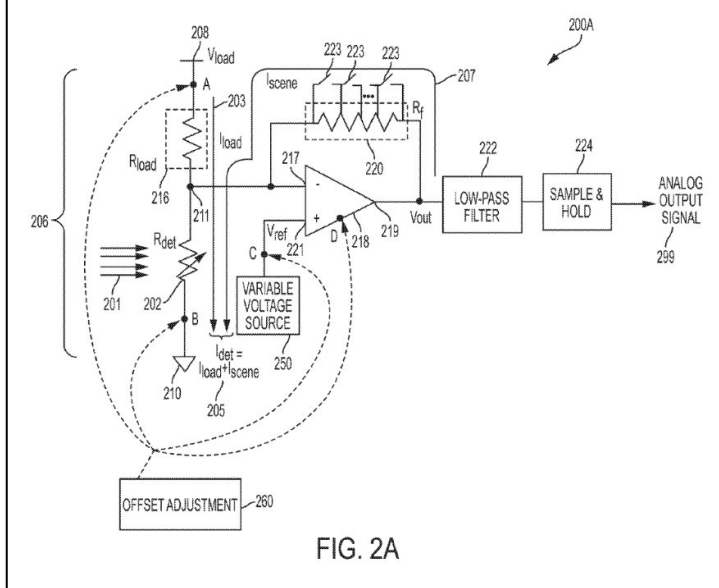
U.S. Patent 8,063,369	Teledyne Infringing Activity ¹
	 <p style="text-align: center;">FIG. 2A</p> <p><u>Exemplary Sources</u> <i>E.g.</i>, FLIR Support – Microbolometer Packaging & Vacuum Information; Teledyne FLIR Patent Marking Notice – Identifying U.S. Patent 11,012,647 for Boson; U.S. Patent No. 11,012,647 at col. 14:18-45, Fig. 2A (describing active bolometer 202, which has a resistance that changes in response to incident infrared radiation 201).</p>
1C	<p>conductors attached to the first bolometer, for detecting electrically the radiation power directed at the element</p> <p>The Accused Instrumentalities include conductors attached to the first bolometer for detecting electrically the radiation power directed at the element.</p> <p>For example, in Teledyne’s Boson and Boson+ thermal imaging modules, each microbolometer sensing element is electrically connected to a readout integrated circuit (ROIC) via a conduction path that enables the electrical detection of radiation-induced resistance changes. Specifically, the electrical signal generated by the first bolometer’s heating resistance in response to absorbed infrared radiation is</p>

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	<p>transmitted through conductor pathways, which form an integral part of the bolometer's readout system.</p> <p>Teledyne's '647 patent, which Teledyne itself identifies as covering their Boson family of thermal camera products, explicitly discloses such conductor connections. Figure 2A of the '647 patent illustrates a bolometer conduction path (206) that electrically links the active bolometer (202) to the readout electronics. This conduction path includes conductor node (211), which facilitates the electrical detection of radiation power by measuring current variations corresponding to changes in the bolometer's resistance. The '647 patent further describes how this conduction pathway enables the ROIC to extract temperature-dependent signals, directly correlating to the power of incident infrared radiation.</p> <div data-bbox="669 756 1421 1378"> <p>FIG. 2A</p> </div>

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	<p><u>Exemplary Sources</u> <i>E.g.</i>, U.S. Patent No. 11,012,647 at col. 14:18-45, Fig. 2A (describing load bolometer 216, which is thermally shorted to the substrate and has a load resistance that varies with the substrate temperature); Teledyne FLIR Patent Marking Notice (identifying U.S. Patent 11,012,647 as relevant to the Boson family of thermal camera modules).</p>
<p>1E wherein the first and the second bolometers are electrically connected to each other in such a way that the heating resistance of the first bolometer can be biased with the aid of a voltage through the heating resistance of the second bolometer in order to amplify the radiation power detected with the aid of the connection.</p>	<p>The Accused Instrumentalities include a first and a second bolometer that are electrically connected in such a way that the heating resistance of the first bolometer is biased through the heating resistance of the second bolometer in order to amplify the radiation power detected with the aid of connection.</p> <p>For example, Teledyne's Boson and Boson+ thermal imaging modules implement a dual-bolometer architecture, wherein the first, active bolometer (202) and the second, load bolometer (216) are electrically connected in a manner that directly influences the biasing and amplification of detected radiation power. As detailed in Teledyne's '647 patent, which Teledyne itself identifies as covering their Boson family of thermal camera products, the active bolometer is biased with a load current (I_{load}), which is generated by a voltage across the heating resistance of the load bolometer. The load bolometer controls the current flowing through the active bolometer, thereby enabling precise biasing and amplification of the radiation power received by the active bolometer.</p> <p>The '647 patent's Figure 2A shows that the active bolometer (202) receives its biasing via a conduction path that includes the load bolometer (216). Specifically, the load current (I_{load}) is a bias current that passes through the active bolometer, ensuring a stable operating condition while enhancing the detected signal. This configuration directly corresponds to the claimed requirement that the first bolometer's heating resistance is biased via the second bolometer's heating resistance. Moreover, by modulating the voltage potential across the load bolometer, the system enables amplification of the detected radiation power.</p>

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	<div data-bbox="667 321 1354 885" data-label="Diagram"> <p style="text-align: center;">FIG. 2A</p> </div> <p><u>Exemplary Sources</u> <i>E.g.</i>, U.S. Patent No. 11,012,647 at col. 15:35-56, Fig. 2A (describing how active bolometer 202 is biased with current 203, which is generated through the load bolometer 216 in response to the voltage potential between supply voltage 208 and the reference voltage at node 211).</p>